

“Counting Deer” by the SAK Method

A common question of hunters is “How does the DNR count deer?” DNR does not count deer. We count dead deer harvested by hunters and use those figures to estimate the number of deer in a Deer Management Unit (DMU). Hunter harvest is the foundation for our estimate using the SAK (Sex-Age-Kill) method. There is no way to duplicate the information-gathering power of hundreds of thousands of hunters. The SAK capitalizes on this power.

SAK is not a predictive tool. SAK uses information collected by hunters to reconstruct (after the hunting season has ended) what the deer herd was when the hunting season began. You only need to focus on 4 things 1) buck harvest, 2) the percent of bucks harvested, 3) doe to buck ratio, and 4) fall fawn to doe ratio. That it is all you need to know. SAK takes the buck harvest and uses data collected by field biologists and hunters to estimate the *pre-hunt* buck, doe, and fawn populations. You then add them up (bucks + does + fawns) and there's your estimate of the deer that were on the landscape *before* hunting season opened.

What SAK does:

- SAK incorporates hunter harvest to provide estimates for the deer population at two points: 1) Pre-hunt (September 15); 2) Post-hunt (February 1).
- SAK estimates the deer population *after* the hunting season is over. For example, SAK estimates of the deer population as of September 2008 and February 2009 were completed in February 2009.
- SAK takes the total buck kill and age structure of the harvest and expands this to a pre-hunt population estimate.
- By dividing the SAK population estimate by the amount of deer range, a post-hunt average deer density across an entire DMU can be obtained.
- SAK provides an independent, reliable, and cost effective population estimate every year.

What SAK does not do:

- SAK does not predict pre-hunt populations BEFORE the hunting season.
- SAK does not predict deer distribution across a DMU.
- SAK does not predict deer population growth from one season to the next.
- SAK does not estimate the number of deer on any one parcel of property.
- SAK does not estimate deer populations after EAB seasons.
- SAK does not predict deer harvest.
- SAK does not connect the SAK estimate in one year to the SAK estimate in previous or future years (the estimates in any given year are independent of all other SAK estimates in other years).
- SAK does not directly estimate the impact of predators on deer populations. However, since the estimate is valid immediately prior to the hunting season, the impact of predation prior to hunting is accounted for in the population estimate.

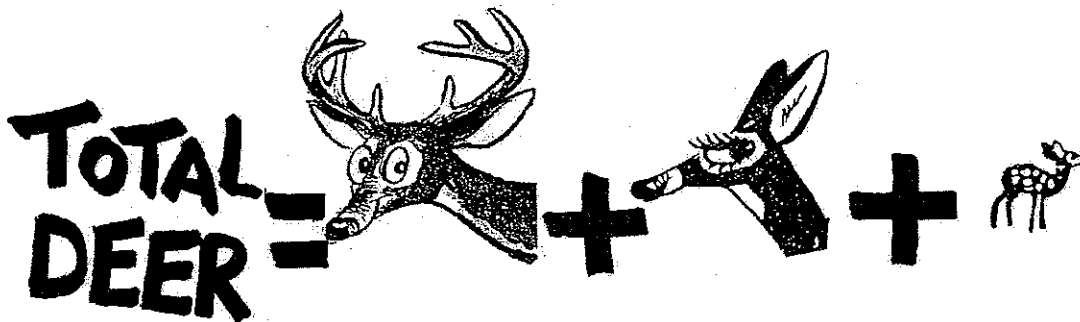
Limitations :

- A major limitation of the SAK, and nearly all other methods of estimating deer populations, is that they are not useful on small areas. SAK cannot estimate the deer population on a single property.
- SAK is limited in that some inputs are derived from past research. Updating this research would provide valuable updates to these parameters. However, this is very costly.
- SAK is not a predictive tool. It reconstructs the population *after* the hunting season has ended.
- SAK estimates become less reliable as the population size (DMU size) being sampled decreases.

Methods:

SAK is employed AFTER the season is over and the total harvest is known. It takes the number of bucks harvested, the age structure of the buck and doe harvest, and observed summer fawn to doe ratios and estimates the number of bucks, does, and fawns on the landscape BEFORE that hunting season began (pre-hunt). This is the pre-hunt population estimate.

Then the total harvest is multiplied by 1.15 (to account for an estimated 15% non-recovered wounding and poaching mortality) and subtracted from the pre-hunt population to develop a post-hunt, or overwinter, population estimate. It is this overwinter population estimate is used to assess the population relative to the overwinter goals established in Administrative Code.



Other population models:

After an EAB season, population estimates are done by using SAK as a calibration model and developing an estimate with an accounting style model such as DeerCamp or POP2. Accounting models require far more intense data inputs and more assumptions and estimations of deer population parameters. Estimates from these models are dependent on previous estimates and on the starting population used in the model (unlike SAK which is an independent point every year) and can be at risk of compounding error.

Projecting the fall population going forward:

Predicting the fall status of the herd adds another level of possible error as this is based on historic data on herd growth. We can estimate from historical harvest data how deer herds grow between February and September under various winter conditions and

apply these averages to project what we expect to happen in any given year. However, this is not a part of the SAK population model. Winter weather conditions, spring fawning conditions and many other variables impact this growth rate.

Details of the SAK Method

Harvest – Harvest data is obtained using mandatory check stations as in Wisconsin. Convenient location of stations and tradition encourages compliance by hunters. Here, sex and age of harvested deer can be determined and recorded to specific geographic areas (deer management units). Every fall, DNR staff and cooperators age over 20,000 deer for inclusion in the SAK population model.

Adult:sex ratio - This is the number of adult does to adult bucks in the fall population. This ratio is estimated by a comparison between the harvest age composition of bucks and does. Such comparisons show that many more does than bucks live to be 3.5 and 4.5 years old and older. This tells us that bucks are dying at a faster rate than does. We can use this relationship to estimate the adult sex ratio. Simply speaking, if buck and doe fawns were born in approximately equal numbers and if bucks died about twice as fast as does then the adult sex ratio would be about 2 does/buck.

Fawn Doe ratio – Roadside observations of fawns per doe are conducted every July – September by department staff and cooperators. This method is one of the best indicators of current fawn production. This measurement is used to estimate the fawn portion of the deer population.

Buck harvest rate – By estimating the proportion of adult bucks that die from legal harvest we can estimate the number of antlered bucks on the landscape at the start of the hunting season. To do this, we rely on past research that provides estimates of the proportion of all buck mortality that is due to legal hunting. In heavily hunted populations, relatively few bucks are exposed to other mortality sources and the vast majority (~ 90%) of buck death is due to legal harvest. In more lightly hunted populations, more bucks survive the hunting season and greater numbers are exposed to other causes of mortality. In these populations the proportion of deaths due to legal harvest may be as low as 60%.

